

3.0 AASHTO CONTROLLING DESIGN CRITERIA

3.1 Introduction

The existing design features of US 60 Superior to Globe (MP 226.85 to MP 252.23) have been examined and evaluated relative to the American Association of State Highway and Transportation Officials (AASHTO) Controlling Criteria outlined in the **1990 edition** of “A Policy on Geometric Design of Highways and Streets,” commonly referred to as the AASHTO “Green Book.” ADOT’s publication, “Roadway Design Guidelines” (**1996 edition**) was used as a reference for the evaluation. A complete presentation of the data and evaluation is contained in the November 1999 report, AASHTO Controlling Design Criteria Report, US 60: Superior to Globe, Contract No. 99-22, TRACS Nos. 60 PN 227 H 5160 01L and 60GI 227 H 5160 01L. A summary of the evaluation follows. ***It should also be noted that these evaluations will need to be re-evaluated in part with the development of any further design documents, as both ADOT and the AASHTO documents have changed with respect to design criteria. For the purposes of comparison, and general corridor evaluation, the observations originally evaluated in the earlier parts of this study are still valid, thus they have been included in this final feasibility document.***

3.2 Lane Width and Shoulder Width

The rural section of US 60 from Superior to Miami (MP 226.85 to MP 243.65) is primarily a two-lane roadway with 12 foot lanes and 8 foot paved shoulders throughout its length except where left turn lanes and climbing lanes have been installed. Where these features exist, shoulders are reduced to one to two feet wide.

The urban section of US 60 from Miami to the end of project at the intersection of US 70 in Globe (MP 243.65 to MP 252.23) is a curbed urban section consisting of 4 or 5 lanes.

Lane widths meet AASHTO criteria throughout the project length. However, more than 40 percent of the rural section has shoulder widths less than the minimum 8 feet recommended by AASHTO due to the addition of left turn lanes and climbing lanes.

All lane and shoulder widths used in developing design concept alternatives for this report conform to current ADOT design recommendations (see Section 4).

3.3 Design Speed

The study route was evaluated in terms of classification, use, and terrain in determining the appropriate AASHTO minimum design speeds to be used for evaluating the alignment. The results of the classification evaluation are shown in **Table 3-1**.

Table 3-1 Functional Classification

Location	Functional Classification	Terrain	Posted Speed Limit	AASHTO Recommended Minimum Design Speed
MP 226.85 to MP 230.3	Rural Arterial	Mountainous	50 mph	40 mph
MP 230.3 to MP 243.1	Rural Arterial	Mountainous	55 mph	40 mph
MP 243.1 to MP 243.7	Rural Arterial	Rolling	45 mph	50 mph
MP 243.7 to MP 245.1	Urban Arterial	Rolling	35 mph	40 mph
MP 245.1 to MP 247.3	Urban Arterial	Rolling	40 mph	40 mph
MP 247.3 to MP 249.6	Urban Arterial	Rolling	45 mph	40 mph
MP 249.6 to MP251.1	Urban Arterial	Rolling	35 mph	40 mph
MP 251.1 to MP 251.9	Urban Arterial	Rolling	30 mph	40 mph
MP 251.9 to MP 252.2	Urban Arterial	Rolling	45 mph	40 mph
MP 252.2 to MP 252.6	Urban Arterial	Rolling	55 mph	40 mph

3.4 Grades

AASHTO recommends the following maximum grades for design speed and terrain. See **Table 3-2** for rural non-divided highways and **Table 3-3** for urban and fringe urban non-divided highways.

Table 3-2 Rural Non-Divided Highways

Design Speed	Terrain		
	Level	Rolling	Mountainous
40 mph			8%

50 mph		5%	
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Table 3-3 Urban and Fringe Urban Non-Divided Highways

Design Speed	Terrain		
	Level	Rolling	Mountainous
30 mph		9%	

An evaluation of the existing grades based on the foregoing criteria is:

- All existing grades are less than the AASHTO recommended maximum allowable grades for the AASHTO recommended minimum design speeds.

3.5 Cross Slopes

Normal section cross slopes are 1.0 - 1.5% throughout the rural section of the project and 3.00% throughout the urban section. These cross slopes are within the AASHTO recommended ranges of 1.5-2.0 % and 1.5-3.0 % for rural and urban sections respectively.

3.6 Vertical Clearance

There is one overpass within the rural section of the project.

- Route 177 TI UP (#438) at MP 226.85 has vertical clearance of 14’-8” which is less than the AASHTO recommended minimum of 16’. The SR 177 interchange and ramps are included in an improvement project currently under design. The planned improvements will not improve the vertical clearance of the bridge.

There are two pedestrian overpass structures within the urban section of the project.

- Central School Ped. OP (#1788) at MP 250.34 has 17’-8” vertical clearance.
- Globe School Ped. OP (#488) at MP 251.27 has 17’-0” vertical clearance.

Both of these structures meet or exceed the AASHTO Minimum Allowable Clearance of 17’-0”.

3.7 Structures

There are fifteen bridges within the limits of the project. All fifteen bridges meet the AASHTO recommended bridge width. Three of the bridges do not have adequate bridge rail geometry. Seven of the bridges do not meet AASHTO recommended structural capacity. An analysis of the existing structures is included in the AASHTO Report completed for this project.

The structures included in each of the design concept alternatives presented in this report will conform to current ADOT design recommendations.

3.8 Vertical Alignment and Stopping Sight Distance

A total of 164 vertical curves are located within the limits of the study route. 153 of these meet AASHTO recommended minimums for stopping sight distance when evaluated relative to the minimum design speeds for this study. 11 of the vertical curves have stopping sight distances that are less than the AASHTO recommended minimums. A listing of the vertical curve analysis is contained in Attachment 1 of the AASHTO Report completed for this study.

The vertical alignments developed for each of the design concept alternatives presented in this report conform to current ADOT design recommendations.

3.9 Horizontal Alignment and Stopping Sight Distance

The existing horizontal alignment contains 105 horizontal curves. Based on an analysis of as-built plans, the following generally describes the horizontal alignment relative to the AASHTO recommended minimum design speeds for the study. Of the 105 horizontal curves:

- The existing superelevation of 40 horizontal curves on US 60 is less than the AASHTO recommended minimums.
- The existing superelevation of 6 horizontal curves on US 60 exceeds the AASHTO recommended maximums.

A listing of the horizontal curve analysis is included in Attachment 2 of the AASHTO Report completed for this study.

The horizontal alignment developed for each of the design concept alternatives presented in this report conforms to current ADOT design recommendations.